Damage Survey and Photogrammetric Analyses of Tornadoes, Mesocyclones, and Hook Echoes Observed During VORTEX II

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Science Objectives

1. To investigate the relationship between the tornado and its parent circulation. More specifically:
   - To examine the relationship between the intensities of the mesocyclone and tornado and attendant surface damage intensity.
   - To examine the causes of nonlinear surface damage patterns such as trochoidal and scalloping marks, left and right turns, and sinusoidal patterns.

2. To better understand features within the hook echo such as single-Doppler velocity features, multi-parameter signatures, weak echo eyes, and debris rings.

3. To examine the relationship between radar-detected wind speeds with observed damage estimates based on the EF scale.

Instrument Description

Photogrammetry:

1. Two teams, two photographers per team
2. DSLR imagery of wall cloud, tornado and attendant debris cloud
3. GPS Data Loggers - Geo tagging image files
4. Possibly HD video

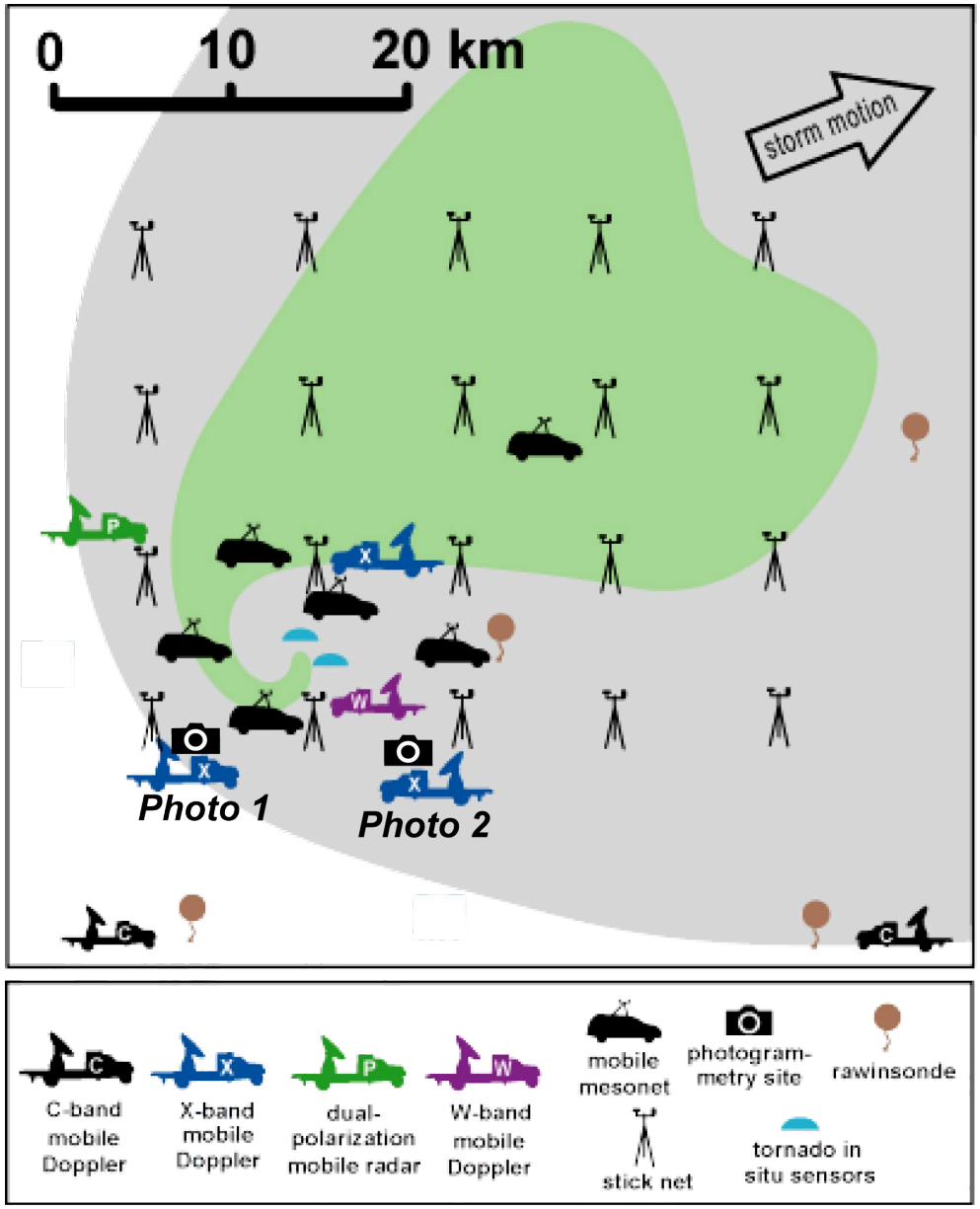
Damage Survey:

1. Two teams, two surveyors per team
2. Aerial - Cessna 172 rental - approximately 80 hours budgeted
3. One ground team

Deployment Strategies

Photogrammetry:

1. Collocate each team with the X-band DOWS
2. Likely DOW 6 and 7



Deployment Strategies

Damage Surveys:

1. Damaged areas will be identified (VORTEX PIs, NWS personnel)
2. Detailed aerial and ground surveys will be conducted immediately after an event.
3. Missions on consecutive days will be a challenge.
4. Priority will be placed on completing surveys in a timely manner.

Additional Information

- Photo teams will need to monitor communication between FC and DOWS
- We will be interested in acquiring and archiving any other photo/video data collected by PIs and chasers who are willing to share.
- May need assistance from additional ground survey teams for multiple tornado events – VORTEX II PIs? NWS personnel?